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(56) Documents Cited

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## (54) Adjustable control with resettable operating range

(57) The operating range of an adjustable control such as a rotary control for a dimmer light switch, can be pre-set. It is desirable to pre-set a dimmer switch control to provide at least a minimum setting for illumination at switch on of the light switch. An adjustable control knob 8 is provided for attachment to the rotary control 6 of the dimmer switch potentiometer 2a. An abutment member (11/13, figure 4) is provided on the knob 8 and is arranged to abut a stationary member (12, figures 1 - 3) provided on a housing of the potentiometer, to prevent the knob being turned back/forward beyond a predetermined position. Minimum setting is achieved by adjusting the rotary control 6 to produce minimum desired illumination, and then fitting the knob 8 so that the abutment member and stationary member are proximate each other and the knob cannot be turned backwards any further.

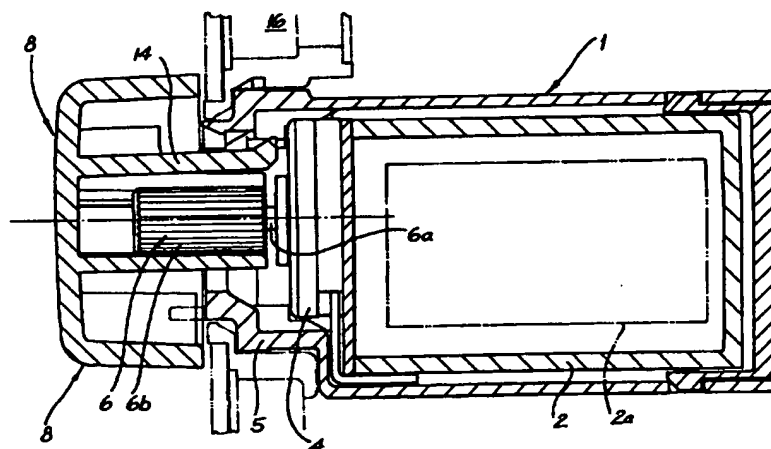
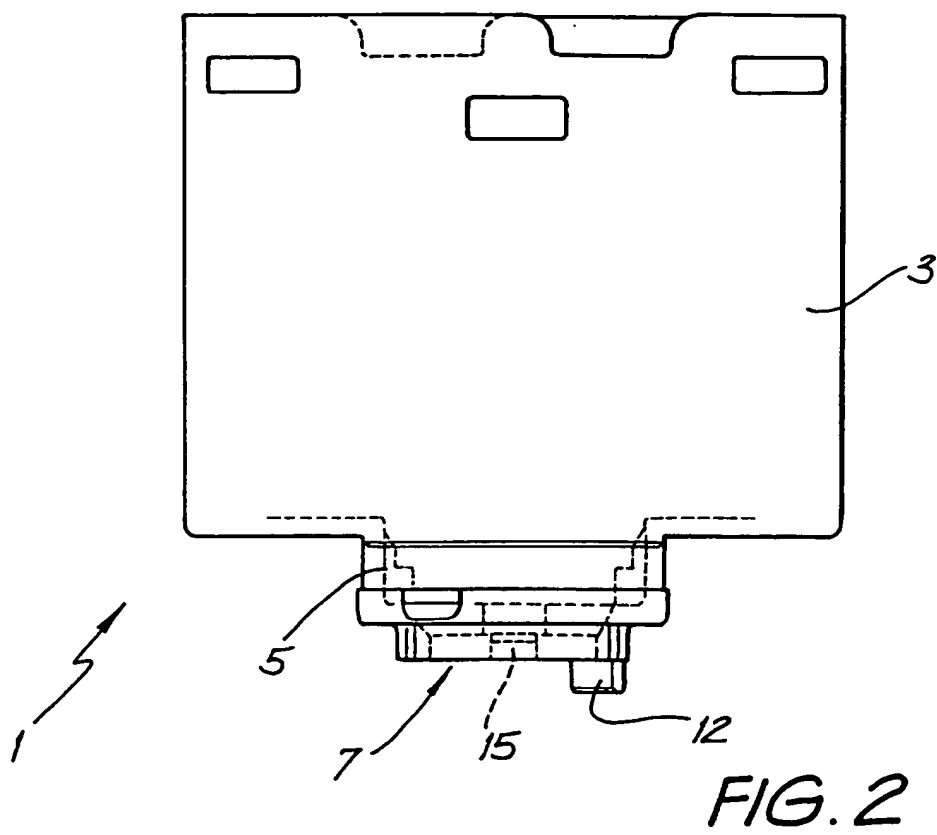
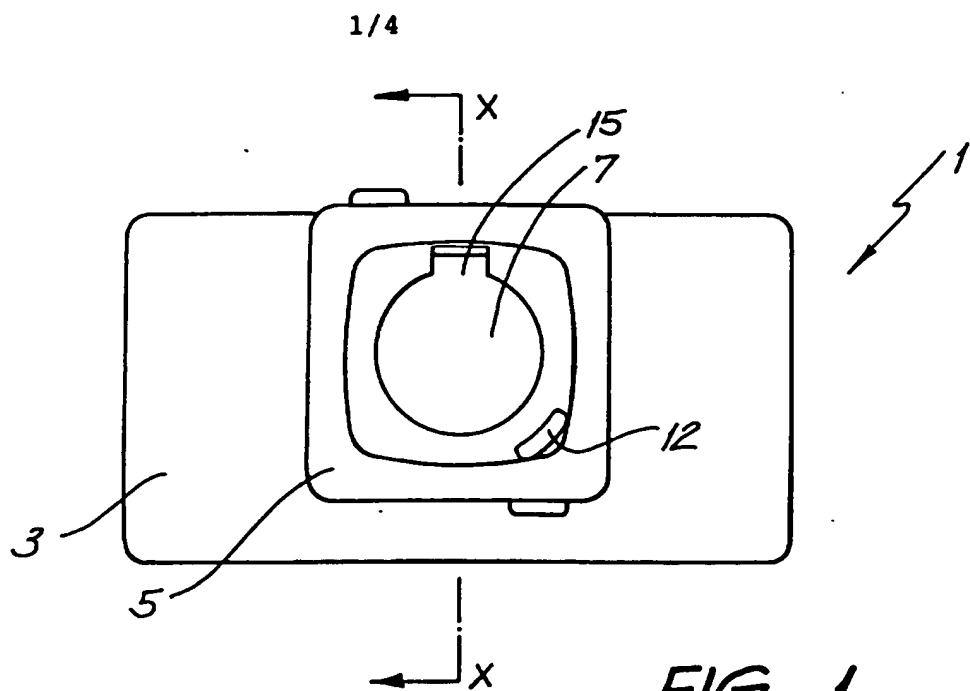


FIG. 6

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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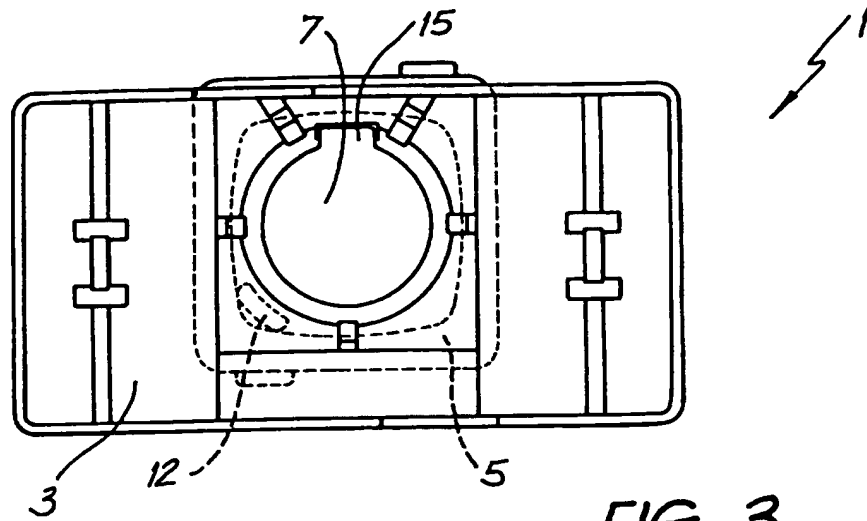


FIG. 3

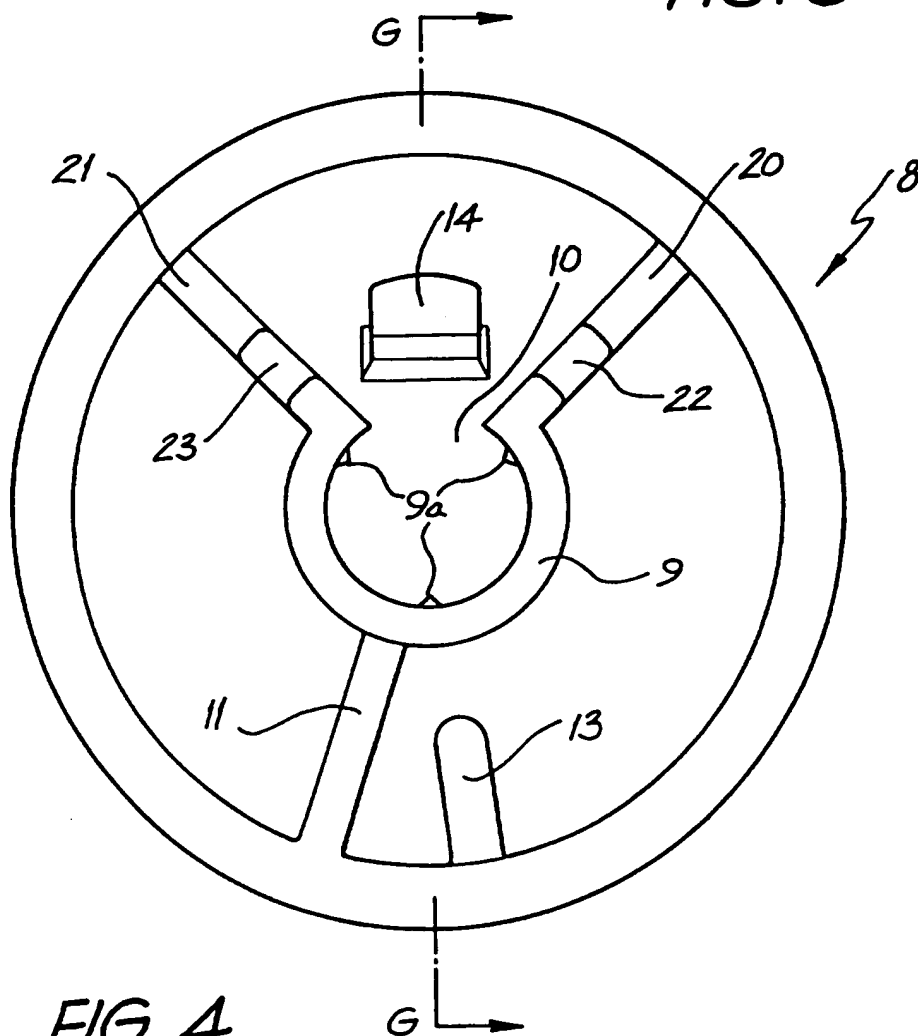


FIG. 4

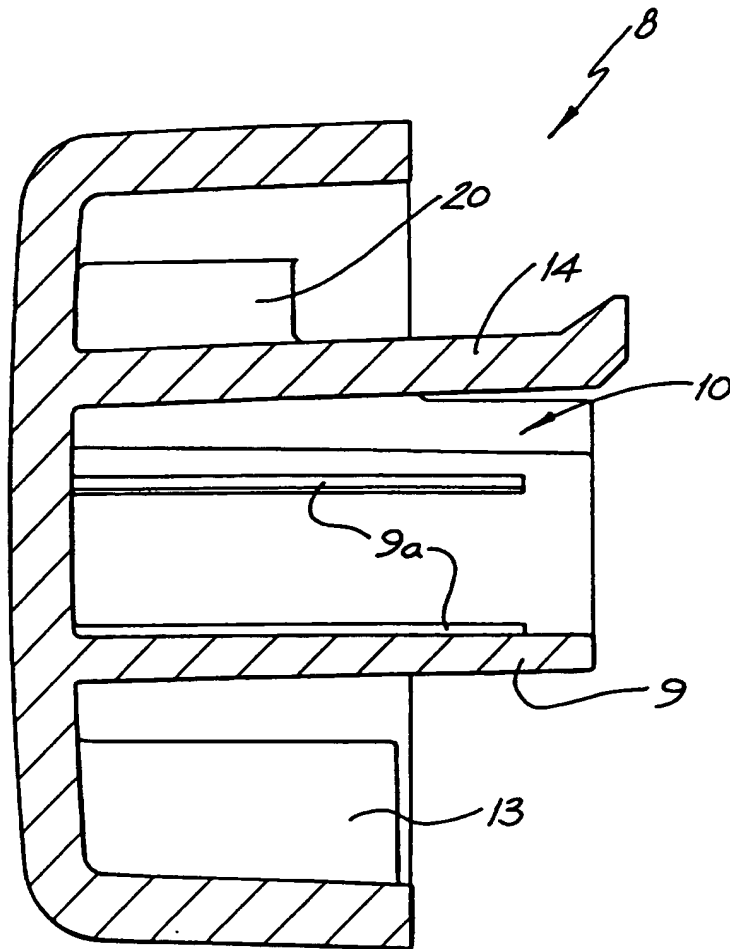


FIG. 5

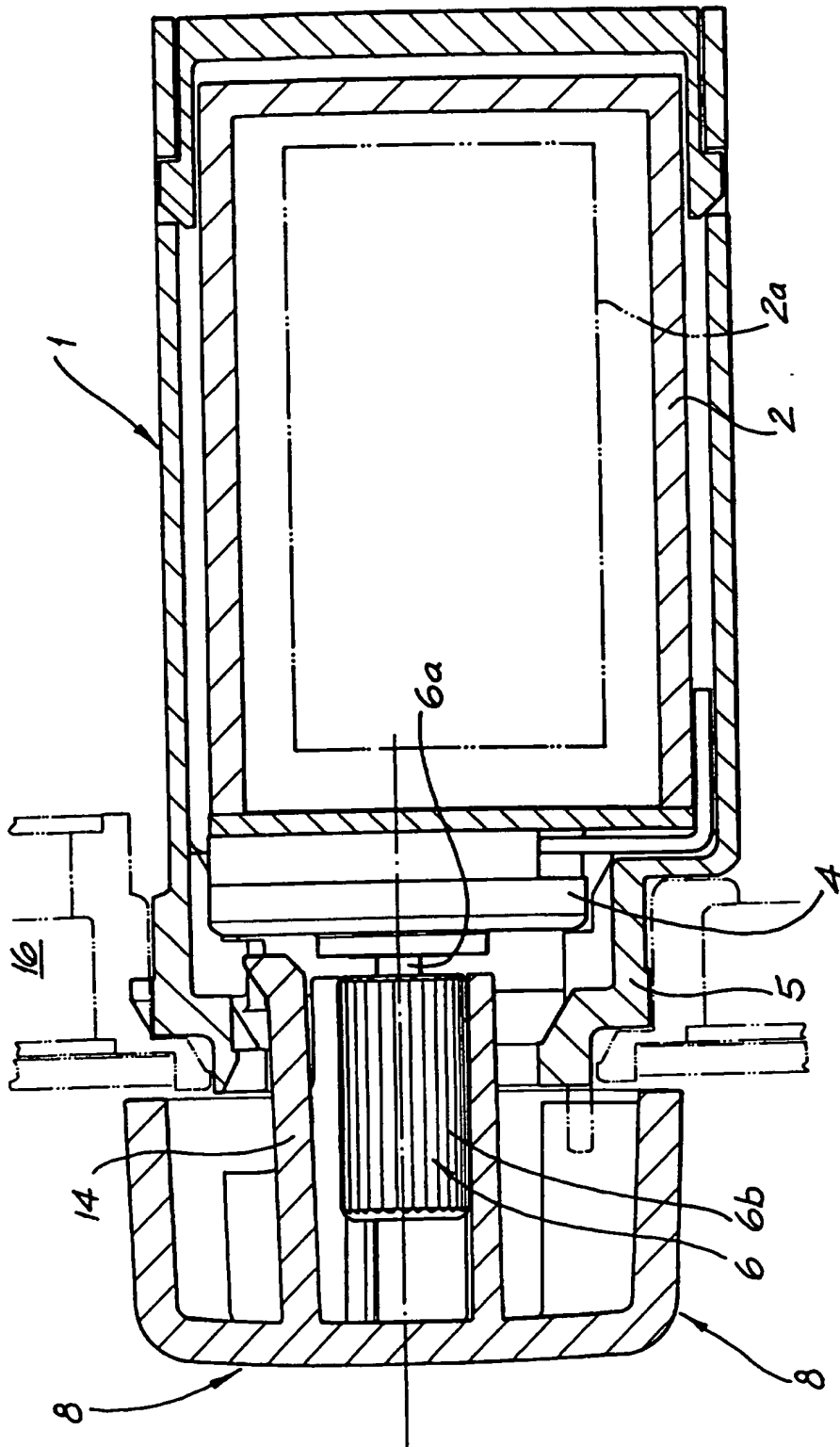


FIG. 6

ADJUSTABLE CONTROL WITH RESETTABLE OPERATING RANGE

The present invention relates to an adjustable control with a pre-settable operating range, and, particularly, but not exclusively, to a dimmer light switch control having a pre-settable operating range.

Dimmer switches are known for controlling the illumination intensity of electric lamps, domestic or otherwise. On installation of a dimmer switch, it is desirable to pre-set an operating range of the dimmer control to provide at least a minimum illumination intensity at switch on.

Dimmer switches generally operate by adjustment of a potentiometer affecting the amount of electrical energy provided to the lamp. Minimum setting in these known dimmers is usually achieved with the aid of an extra potentiometer located in the dimmer circuit. The extra potentiometer is separately adjusted to provide the minimum illumination setting, on installation of the dimmer. The requirement for the setting operation of this extra potentiometer gives rise to a number of disadvantages.

In new installations, the dimmer switch first has to be wired in before power supply can be turned on. After the power has been connected, the electrician must then remove the dimmer circuit from its mounting to adjust the extra potentiometer to provide the minimum illumination setting. This results in an increase in the labor required for dimmer installation.

The requirement for an extra potentiometer increases the cost of the dimmer.

The present invention provides an adjustable range control, comprising a control member normally moveable through the entire extent of an operating range for controlling a device, and an attachment member attachable to the control member and arranged to limit movement of the control member to a predetermined range falling within the operating range.

The predetermined range is preferably determined

by, firstly, adjusting the control member to a pre-desired point within it's normal operating range and then attaching the attachment member. The predetermined range is preferably dependant upon the initial adjustment  
5 of the control member within it's operating range.

In a preferred embodiment, the control member is a rotary control arranged to be rotated throughout it's operating range. The attachment member is a knob adapted to fit over the rotary control via means arranged to  
10 prevent relative movement between the knob and rotary control once the knob is fitted. The knob is provided with an abutment member which is arranged to abut against a member which is stationary relative to the knob and control, when the knob is at one extreme of the  
15 predetermined range. A guide means is provided to ensure that the knob is fitted to the rotary control such that the abutment member is located in a predetermined position relative to the stationary member on initial fitting of the knob.

20 The device is preferably a dimmer switch and the control member preferably effects control of a potentiometer to vary the intensity of illumination provided by a lamp connected to the dimmer circuit. In operation of the preferred embodiment, the rotary control  
25 member is pre-adjusted to a desired minimum setting. The attachment knob is then fitted over the rotary control member with the abutment member in the predetermined position, preferably proximate the stationary member. The stationary member and the abutment member prevent the  
30 knob, and therefore the rotary control, from being turned back past the predetermined minimum setting. The maximum setting is still determined by the upper limit of the normal operating range of the rotary control.

In at least a preferred embodiment, the  
35 adjustable range control of the present invention has the advantage that, for dimmer switch circuits, no extra potentiometer is required for enabling minimum illumination setting. Further, because the attachment

member attaches directly to the rotary control member of the dimmer, there is no requirement for the extra installation operation of removing the dimmer from its mounting in order to set the minimum illumination.

5           Features and advantages of the present invention will become apparent from the following description of an embodiment thereof, by way of example only, with reference to the accompanying drawings, in which:

10           Figure 1 is a front view of a housing for a dimmer switch control arrangement in accordance with an embodiment of the present invention;

            Figure 2 is a top view of the housing of figure 1;

15           Figure 3 is a view from the rear of the housing of figure 1;

            Figure 4 is a rear view of an attachment member for use with the housing of figure 1, the attachment member being shown in a larger scale than the housing of figure 1;

20           Figure 5 is a section on line GG of figure 4; and

25           Figure 6 is a side-sectional view through an assembled arrangement of the attachment member of figures 4 and 5 (sectioned along line G-G of Fig 4), the housing of figures 1 to 3 (sectioned along line X-X of Fig 1), and a dimmer control of a dimmer circuit mounted within the housing, the entire arrangement being shown mounted within a wall cavity.

30           Figures 1 to 3 illustrate a housing 1 adapted to mount circuitry for a dimmer switch for controlling illumination intensity of an electric lamp, together with a rotary control member for effecting control of the dimmer switch via adjustment of a potentiometer or the like connected within the dimmer switch circuitry. In  
35           operation, the housing mounting the dimmer circuitry and rotary control is intended to be mounted within a wall cavity.

            Figure 6 illustrates an assembly incorporating



the housing 1 and showing the rotary control 6 and dimmer circuitry in schematic within the housing 1, within a wall cavity. Figure 6 also shows in cross-section an attachment knob 8 attached to the rotary control 6. The attachment knob is shown in more detail in figures 4 and 5.

The housing for the dimmer switch circuitry and rotary control is designated generally by reference numeral 1. The dimmer switch circuitry (illustrated schematically by block 2a, but not shown in detail) is mounted in a box 2 (figure 6) which seats within the rearward portion 3 of the housing 1. The rearward portion 3 of the housing 1 contains a substantially rectilinear volume defined by walls of the housing 1. A rotary control mounting 4 of the dimmer switch box 2 seats within a forwardly extending portion 5 of the housing 1, as shown in figure 6, with the rotary control 6 extending outwardly of an opening 7 in the forwardly extending portion 5. The rotary control 6 rotates pin 6a to control the level of a potentiometer (not shown) in a manner known to those skilled in the art, in order to control the illumination level of a lamp to which the dimmer switch circuitry 2a is connected.

In operation, the rotary control 6 can normally be rotated through the entire extent of an operating range, i.e., from minimum to maximum of the potentiometer controlling the dimmer circuitry. As discussed above, however, it is desirable to set a minimum level of illumination, so that even if the dimmer switch is adjusted to its lowest level light will still be present when the lamp is first switched on. In the illustrated embodiment, minimum setting is achieved by attachment of an attachment member, in the form of an attachment knob illustrated in figures 4 and 5 and shown attached to the rotary control 6 and housing 1 assembly in figure 6.

The attachment knob is indicated generally by reference numeral 8 and is shown in larger scale in figures 4, 5 and 6 than the scale of the housing shown in

figures 1, 2 and 3. The attachment knob 8 is attachable to the rotary control 6 in such a way as to limit movement of the rotary control 6 to a predetermined range falling within the normal operating range of the rotary control 6.

The attachment knob 8 is formed with a centrally extending sleeve 9, open at one side 10. The sleeve 9 fits over and receives the rotary control 6, as shown in figure 6. Means are provided to prevent relative movement between the sleeve 9 (and therefore attachment knob 8) and the rotary control 6, when the sleeve 9 is fitted to the rotary control 6. The means may comprise interengaging teeth or corrugations (shown schematically as 9a, 6b) on the internal surface of the sleeve 9 and external surface of the rotary control 6, respectively. An abutment member 11 is provided within the attachment knob 8 and arranged, in operation, to cooperate with a stationary member 12 which projects outwardly of the forwardly extending portion 5 of the housing 1, to prevent anticlockwise motion of the attachment knob 8 beyond a predetermined point determined by the position of the stationary member 12. A further abutment member 13 within the knob 8 prevents rotation of the knob in a clockwise direction past the stationary member 12.

A resilient guide member 14 is provided mounted above the opening 10 in the sleeve 9. The guide member 14 is arranged, in operation, to cooperate with a guide slot 15 in the forwardly extending portion 5 of the housing 1. The cooperating member 14 and slot 15 ensure that when the knob 8 is fitted to the rotary control 6, it's orientation with respect to the housing 1 and, in particular, the respective orientations of the abutment member 11 and stationary member 12, is predetermined. In this preferred embodiment, the orientation of the cooperating member 14, slot 15 and abutment member 11, are such that on fitting of the knob 8 to the rotary control 6, the abutment member 11 is positioned adjacent the stationary member 12, so that no anti-clockwise rotation

or only very limited anti-clockwise rotation of the knob 8 is allowed in this initial knob position. The minimum setting of the rotary control 6 is thus ensured. The arrangement could be such that the relative positions of the abutment member 11 and stationary member 12 could be other than adjacent each other on initial fitting of the knob 8. As long as the relative positions of the member 11 and stationary member 12 are known, the minimum setting of the rotary control 6 can be achieved. It is preferred, however, that the abutment member 11 and stationary member 12 predetermined positions be proximate each other.

On installation of the dimmer switch control described above, a setting of minimum illumination intensity of the lamp being controlled is achieved in the following manner:-

The housing 1 with dimmer switch circuitry 2 is seated within a cavity of a wall 16 and wired into the electrical system by the electrician. Power is then turned on.

The rotary control 6 is then adjusted until the desired minimum illumination intensity is achieved. The attachment knob 8 is then fitted to the rotary control 6. Because the guide member and guide slot 15 cooperate to ensure that the abutment member 11 is positioned adjacent to the stationary member 12, it will be appreciated that the rotary control cannot subsequently be turned back past the set minimum setting, as this will be prevented by the abutment member 11 and stationary member 12.

Minimum setting is therefore achieved merely by mechanical means, without any need for extra minimum setting circuitry, such as an extra potentiometer.

The maximum setting will still be governed by the normal operating range of the rotary control 6. Alternatively, the maximum setting may be governed by the abutment member 13 abutting the stationary member 12 in a clockwise direction. This may be useful where the rotary control has a range which is much greater than one

clockwise turn and this arrangement could therefore be used to set both minimum and maximum settings by selecting a range within both extremes of the normal operating range of the rotary control.

5           From figure 4 it can be seen that a pair of spokes 20, 21 are also provided internally of the knob 8. These reinforcing spokes have cut outs 22, 23 to ensure that they do not interfere with rotation of the knob 8 relative to the stationary member 12.

10           Guide member 14 is resilient in such a manner that, with the application of sufficient force it is possible to remove the control knob 8 from the rotary control, notwithstanding the relative orientation of the guide member 14 and guide slot 15. Because the  
15           attachment knob 8 can be removed, the end user is able to readjust the minimum setting as desired, at any time.

          It will be appreciated that an arrangement in accordance with the present invention could be used to set a maximum setting instead of a minimum setting, or  
20           could be used to set both a maximum and a minimum setting, by appropriate choice of relative orientations of the stationary member and guide means.

          It will also be appreciated that this arrangement could be used for devices other than dimmer  
25           switches, and could be used for any device employing an analogue control where adjustment of the operating range of the analogue control is desirable.

          The present invention also provides an assembly for adjusting the range of an adjustable control, the  
30           assembly comprising an attachment member which is attachable to the adjustable control and arranged to limit the extent of the range of the adjustable control within the normal operating range of the adjustable control.

35           It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of

the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

CLAIMS:

1. An adjustable range control, comprising a control member normally moveable through the entire extent of an operating range for controlling a device, and an attachment member attachable to the control member and arranged to limit movement of the control member to a predetermined range falling within the operating range.

2. An adjustable range control in accordance with claim 1, wherein the predetermined range is set by first adjusting the control member to a pre-desired point within the operating range and then attaching the attachment member.

3. An adjustable range control in accordance with claim 2, wherein the attachment member is attachable to the control member via means which prevent relative movement between the attachment member and the control member, and the attachment member is provided with an abutment member arranged to abut against a stationary member which is stationary relative to the control member and attachment member, whereby to determine one extreme of the predetermined range.

4. An adjustable range control in accordance with claim 3, wherein the control member is a rotary control and the attachment member is a knob arranged to fit to the rotary control so that the rotary control is moveable via the knob.

5. An adjustable range control in accordance with claim 4, wherein the means preventing relative movement between the attachment member and the rotary control are cooperating projections and depressions on the internal surface of a sleeve portion of the knob and external surface of the rotary control.

6. An adjustable range control in accordance with claim 4 or claim 5, guide means being provided to guide the knob so that when it is fitted to the rotary control the abutment means is positioned in a predetermined position relative to the stationary member, whereby the predetermined operating range may be determined by first

adjusting the rotary control to a pre-desired point within the operating range, and then fitting the knob so that the rotation of the knob in one direction is limited by the stationary member interfering with the abutment member.

5           7.       An adjustable range control in accordance with any preceding claim, wherein the device is a dimmer light switch.

          8.       An adjustable range control in accordance with claim 7, wherein the control member controls a single  
10       potentiometer which sets the intensity of the light controlled by the dimmer, and the attachment member is arranged to set the minimum intensity.

          9.       An assembly for adjusting the range of an adjustable control, the assembly comprising an attachment  
15       member which is attachable to the adjustable control and arranged to limit the extent of the range of the adjustable control within the normal operating range of the adjustable control.

          10.       An assembly in accordance with claim 9,  
20       wherein the attachment member is attachable to the adjustable control via means which prevent relative movement between the attachment member and the adjustable control, wherein the assembly further comprises a stationary member which is arranged to be fixed stationary  
25       relative to the adjustable control and attachment member, and the attachment member is provided with an abutment member arranged to abut against the stationary member in operation, whereby to determine one extreme of the operating range.

30       11.       An assembly in accordance with claim 10, wherein the stationary member is provided on a housing arranged to house the adjustable control.

          12.       An assembly in accordance with claims 10 or 11, wherein the adjustable control is a rotary control and  
35       the attachment member is a knob arranged to fit to the rotary control so that the rotary control is moveable via the knob.

13. An assembly for adjusting the operating range of a rotary dimmer switch control, the assembly comprising an attachment knob which is attachable to the rotary control via means which prevent relative movement between the attachment knob and the rotary control, the attachment knob being provided with an abutment member, and a housing for the rotary control, the housing being provided with a stationary member which is arranged to be stationary relative to the rotary control, the attachment member being arranged in operation to abut against the stationary member, whereby to determine one extreme of the operating range.

14. A method of adjusting minimum setting for a dimmer switch having a rotary control, using an assembly in accordance with claim 13, comprising steps of adjusting the rotary control until the illumination is set to a desired minimum, and then fitting the attachment knob to the rotary control so that guide means position the abutment means in a predetermined position relative to the stationary member so that the rotation of the knob in one direction, past the minimum setting, is limited by the stationary member interfering with the abutment member.

15. An adjustable range control constructed and arranged substantially as hereinbefore described with reference to the drawings.

16. An assembly for adjusting the control of claim 15, constructed and arranged substantially as hereinbefore described with reference to the drawings.

17. A method of adjusting minimum settings for a dimmer switch having a rotary control substantially as hereinbefore described.





# The Patent Office

-12-

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Examiner: MRS JENNIFER  
BANNISTER

Claims searched: 1, 9, 13, 14 at least

Date of search: 17 January 1996

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.O): F2Y( YSK YCL YSJ); H1S (SFF SFK SMT)

Int CI (Ed.6): G05G 1/21 1/08 1/00 5/04 5/00; H01C 10/00 10/14 17/00

Other: Online : WPI

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2133854 A (FORD) see control member 14, attachment member 12, limits 25, 28	1,9 at least
X	GB 2001745 A (DUPONT) control member 1, attachment member 2/3, limits 6/7/11	ditto
X	EP 0141947 A2 (BENDIX) control member 62, attachment member 12/14, limits 80, 76, 78	ditto
X	US 5144858 A (EASTMAN KODAK) control member 14, attachment member 20, limits 10, 11a, 12a, 21a, 21b	ditto
X, Y	US 4355544 A (POST) control member 98 fig 5, attachment member 104, limits 146, 150, col 8 lines 15-37	X : 1, 9, 13 at least Y : 14
X	US 4313350 A (KEL-WIN) control member 35 fig 3, attachment member 80, limits 92, 116, 118 fig 13	1, 9 at least
X	US 3512429 A (FRESARD) contrl member 6, attachment member 10, 11, limits 16, 20, 18	ditto

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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